

Smart Home Monitoring

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Design and implement a comprehensive Smart Home Monitoring System using a Raspberry Pi, incorporating environmental sensors, a camera for motion detection, MQTT for message communication, Firebase for data storage, and real-time alerting through email integration. This project aims to enhance home security and environmental monitoring, providing real-time alerts and image captures during events.

Tools, Technologies, and Equipment

- **Raspberry Pi 3B+:**
 - Acts as the central control unit for data collection, image capture, data processing, and communication.
- **Sense HAT:**
 - Measures temperature, humidity, and pressure for environmental monitoring.
- **Camera:**
 - Used for visual monitoring and capturing images upon detecting motion.
- **MQTT Broker (EMQX Cloud):**
 - Facilitates message-based communication between devices and the controller for efficient real-time updates.
 - Subscribes and publishes data to topics for environmental updates and motion detection alerts.
- **Firebase Storage:**
 - Stores captured images from motion detection events and provides URLs for accessed images.
- **Email Integration:**
 - Sends emails with attached images and environmental data upon detection of motion or on-demand through system controls.
- **Blynk Integration:**
 - Utilizes a virtual pin board for real-time data visualization and control interface.
 - Allows real-time visual feedback and remote monitoring via Blynk mobile app.
- **Python Scripting:**
 - Develops Python scripts to handle sensor data readings, motion detection, image capture, data publishing via MQTT, and email notifications.

- User Interface:
 - Uses Blynk for creating a dynamic and user-friendly interface to monitor real-time data and system status.
 - Displays alerts and allows user interactions directly from a smartphone. Create a web-based dashboard for users to monitor real-time and historical data.
 - Display camera snapshots, sensor readings.

Project Repository

[Github Repo](#)